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Fundamental physics changes in response to evolving NASA needs

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AGENDA

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- *Recent NASA Changes*
- *Growing need for access to space for physicists*
- *Rationale for updating the Fundamental Physics in Space Roadmap*
- *Advocacy help from the community*
- *Conclusions*

Recent NASA Changes

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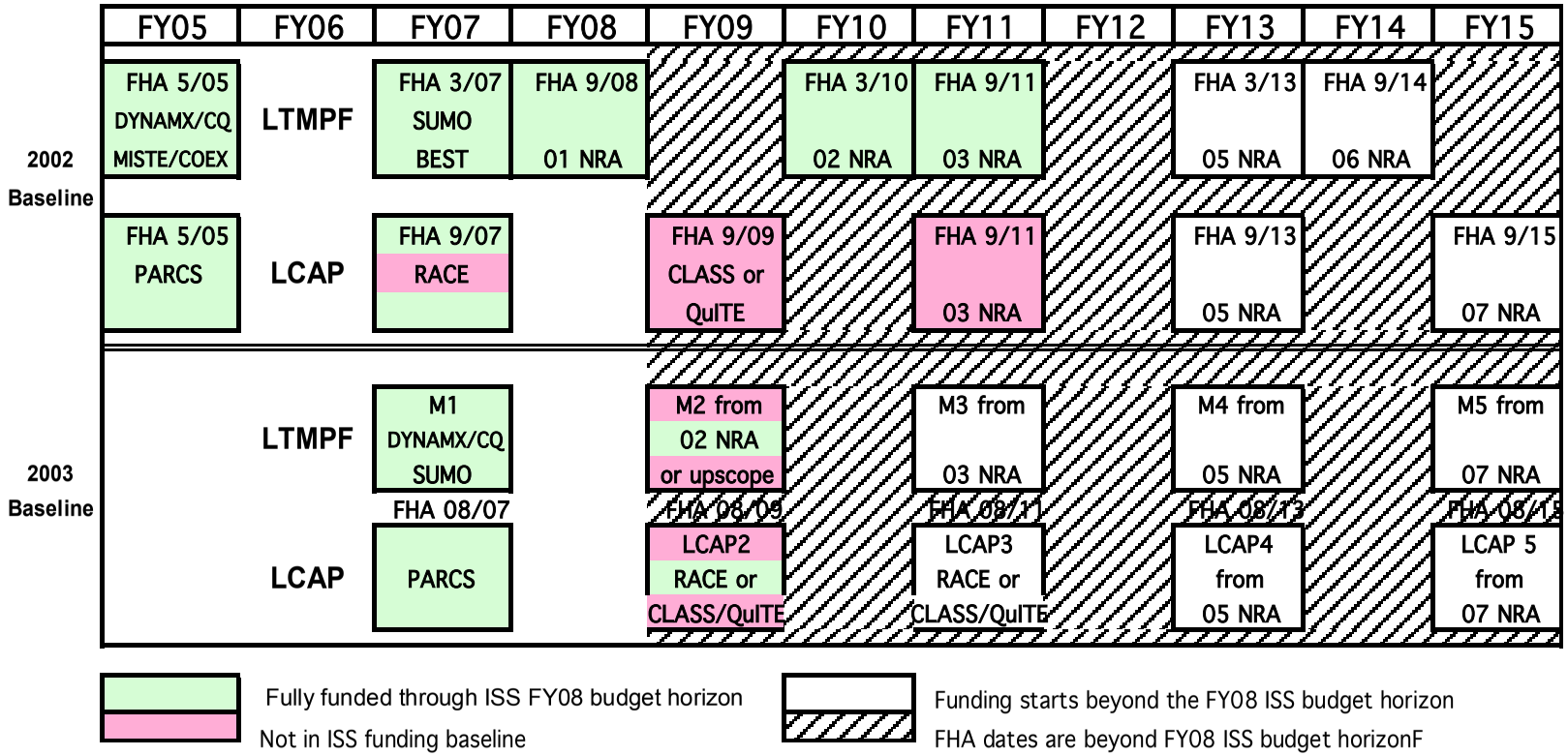
- **REMAP**
  - **Increased budget pressure from Life Science disciplines**
- **Mary Kicza putting her spin on OBPR**
  - **ISS focus on human- tended research**
  - **Increased importance of Strategic Research**
    - Enabling a safe human presence beyond LEO
  - **Free flyer initiative seeking a FY05 new start**
- **Societal relevance is still important**
- **To measure performance is still a requirement**
- **Columbia disaster**

Recent NASA Changes continued

- **JEM-EF delay has forced a slip of LTMPF and PARCS by 2+ years.**
  - **Budget arbitrarily reduced**
- **LTMPF–M1 re-programmed with SUMO instead of MISTE.**
  - **To maximize science return on first mission**
  - **Desire to link PARCS and SUMO clocks to further enhance science**

Current Fundamental Physics ISS Options compared to 2002 Baseline



Growing need for access to space for physicists

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- **Physics is standing at the threshold of major discovery.**
  - **Two of our foundational descriptions of nature, quantum mechanics and general relativity, are incompatible with each other.**
  - **When scientists resolve this conflict, a different view of reality may emerge.**
- **Cosmological observations are providing additional clues that our understanding of reality is in need of modification.**
  - **Most of the energy content of the Universe resides in unknown dark matter and dark energy that may permeate all of space-time.**
- **Resolving the Quantum/gravitation conflict may also shed light on the cosmological unknowns.**
- **Today's availability of high-resolution technology and space access represents a unique opportunity for scientists to address these questions.**
- **Quiescent *sub-microgravity* freely flying research platforms would enhance the chances of major discovery substantially.**
  - **To be discussed on Tuesday afternoon**

Need for Roadmap

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- To continue growing as a discipline, we need to establish a new vision of where we are going that is consistent with today's physics, NASA's strategic plan, and the new OBPR direction.
- 1998 Roadmap focused exclusively on Physics, and did not worry about boundaries between OBPR and OSS
- Updated Roadmap:
  - Must incorporate some strategic research activities to be fully responsive to the current OBPR direction
  - Must capture the imagination of OBPR leadership, OMB, and Congress.
  - Must delineate OBPR from the "beyond Einstein" program in OSS
  - Must address relevancy to Society explicitly
- Status of the Roadmap development will be discussed after lunch today.
  - Seeking community inputs and endorsement
- Draft update targeted for June, final in August

In addition we must….

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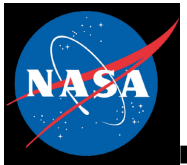
- **Continue to demonstrate research productivity to NASA**
  - **Significant events**
  - **Press releases**
- **Remember that our accomplishments are ultimately evaluated by the scientific community**
  - **Prestigious peer reviewed journals reaching a wide audience**
- **Continue reaching out to students and the general public**
- **Keep thinking about how your technology improvements might be applied to solve human space exploration issues.**
- **Keep thinking about how your technology improvements might be used for Earth applications to enhance national security or promote industrial prowess.**



Conclusions

- **Change continues in the NASA environment**
- **The need for access to space for physicists is growing if we are to fruitfully address today's challenging questions**
- **A new Roadmap is required to demonstrate the importance of our program to stakeholders**
  - Roadmap plans and activities to be discussed after lunch today
- **Our investigators must continue to advocate the benefits of our program:**
  - To NASA and Congress
  - To the scientific community
  - To students
  - To the general public
- **Our investigators must seek ways to use their advanced technology to support a human presence in space and to develop improved Earth applications**

Acknowledgement

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